Group 2 Project—Production Externality , First Draft

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What has been brought up in the following is a two agents general equilibrium model. Under this model, we assume each agent produces only one good; that is, agent 1 produces good x solely and good y, accordingly, are given birth by agent 2.

Then, each one can allocate his utility between purchasing good x and good y, confined to the budget(income) collected form fulfilling his own duty (produce x or y).

Besides, to meet the prerequisite of general equilibrium model, price of X ,price of Y and wage rate W are all fixed first (exogenous variable), coefficient and instead, are determined by python randomly.

Finally, the purposes of this projects are intended to finding labor input that maximize profit and the maximized utilities for each economics agent.

**Step 1. Economic agents’ profit function:**

Where, wage rate

are price of goods x and that of good y are labor input from agent 1 and 2

are production function on labor,

Then, to maximize the profit:

(1)

(2)

**Step 2. Income and budget constraints:**

(1) Agent 1:

(2) Agent 2:

Where is the quantities consumed by agent 1 or 2 on X or Y

**Step 3. Under the labor input when every man maximizes total profit and the budget constraint, deriving maximized utility on purchasing x and y as follow:**

Agent 1 and 2 ‘s utility function:(the number 1.5 is an assumption number served as a “compensation” for buying the good they own produces, which says “a happiness or an accomplishment when consuming the goods produced by oneself)

Agent 1:

Agent 2:

Then, to maximize one’s utility under budget constraint:

(1) For agent 1:

Subject to

The maximized condition for agent 1:

(2) For agent 2:

Subject to

The maximized condition for agent 2: